My NASA Data - Lesson Plans

Simple Soil Moisture Measurement Stations

Purpose

In this activity, students investigate three different soil samples with varying moisture content. They use a soil moisture probe to determine the percentage (by volume) of water in each of the soil samples.

Why Does NASA Study This Phenomenon?

Soil Moisture is the amount of water contained in the pore space of the unsaturated zone. The unsaturated zone is the portion of the soil profile which contains both air and water. NASA's SMAP (Soil Moisture Active & Passive mission) measures the moisture content of the top ~5 cm of the soil profile. These surface layer measurements will be used in computer models to produce estimates of the soil moisture in the root zone, as well as estimates of evapotranspiration, infiltration/exfiltration, and recharge to groundwater.

Essential Questions

1. What is Soil Moisture? What is it important?

2. How do changes in one part of the Earth System affect Soil Moisture?

3. Why should we care?

Materials Required

- 3 round plant pots
- 3 soil samples with varying degrees of moisture content (dry, intermediate, very wet)
- 2 soil moisture probes
- 3 desk lamps with incandescent bulbs (recommended 60 watt bulbs)

Procedure

There will be three sta8ons (labeled Station 1, Station 2, Station 3). Station 1 will have a lamp, plant pot and soil. Stations 2 and 3 will have lamp, plant pot, soil, and a soil moisture probe.

Station 1:

1.) What level of soil moisture do you think this sample is? (Circle One) Dry, Intermediate, Very Wet

2.) What do you think the percentage of water content is in the soil sample? ___%

3.) Is this type a guessing a good es8mate in determining soil moisture? Why or Why not?

Station 2:

1.) What level of soil moisture do you think this sample is? (Circle One) Dry, Intermediate, Very Wet

2.) What do you think the percentage of water content is in the soil sample? ___%

3.) Using the soil moisture probe, measure the % of water in the sample in 5 spots and record that number.

   1.___% 2.___% 3.___% 4.___% 5.___%

4.) Now, find the average of all the numbers to determine the % of water in the soil. ___%

Station 3:

1.) What level of soil moisture do you think this sample is? (Circle One) Dry, Intermediate, Very Wet

2.) What do you think the percentage of water content is in the soil sample? ___%

3.) Using the soil moisture probe, measure the % of water in the sample in 5 spots and record that number. 1.___% 2.___% 3.___% 4.___% 5.___%

4.) Now, find the average of all the numbers to determine the % of water in the soil. ___%

Discussion Questions:

1.) What does the lamp represent in the real world?

2.) Why did we take 5 different soil measurements at each sta8on?

3.) Was it easy or difficult to guess the % of soil moisture in the soil?

4.) Even though we can get a fairly accurate soil moisture percentage using the probes, why is doing this on a global scale not economical, nor feasible?

5.) What is NASA doing to make these measurements more accurate and more efficient?